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(54) Educational and recreational block assembly

(57) An educational and recreational kit having a plurality of blocks, wheels and shafts and a baseboard can be used not only for recreational purpose by assembling the plurality of blocks, wheels and shafts but also for educational purpose by inserting the plurality of blocks into the block board. Faces of the blocks bear numbers or letters. Block protrusions 21 and recesses 22 and baseboard protrusions 11 have the same areas  $L1 \times L1$  for interfitting. The width  $W1$  of recess 12 is equal to  $L1$ , whereas the width  $W2$  of recess 13 is equal to the overall width of a block for reception thereof.

FIG.1A

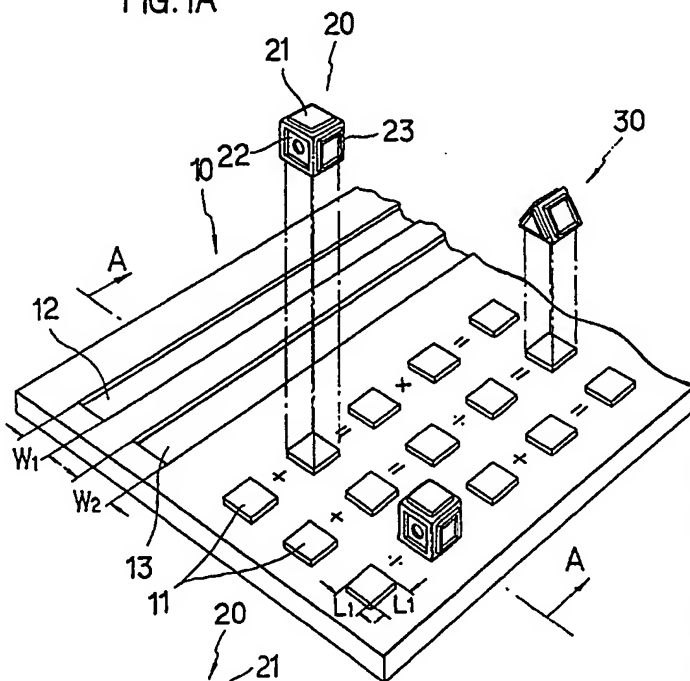
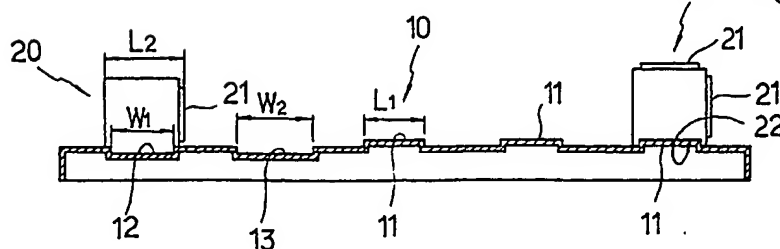


FIG.1B



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FIG. 1A

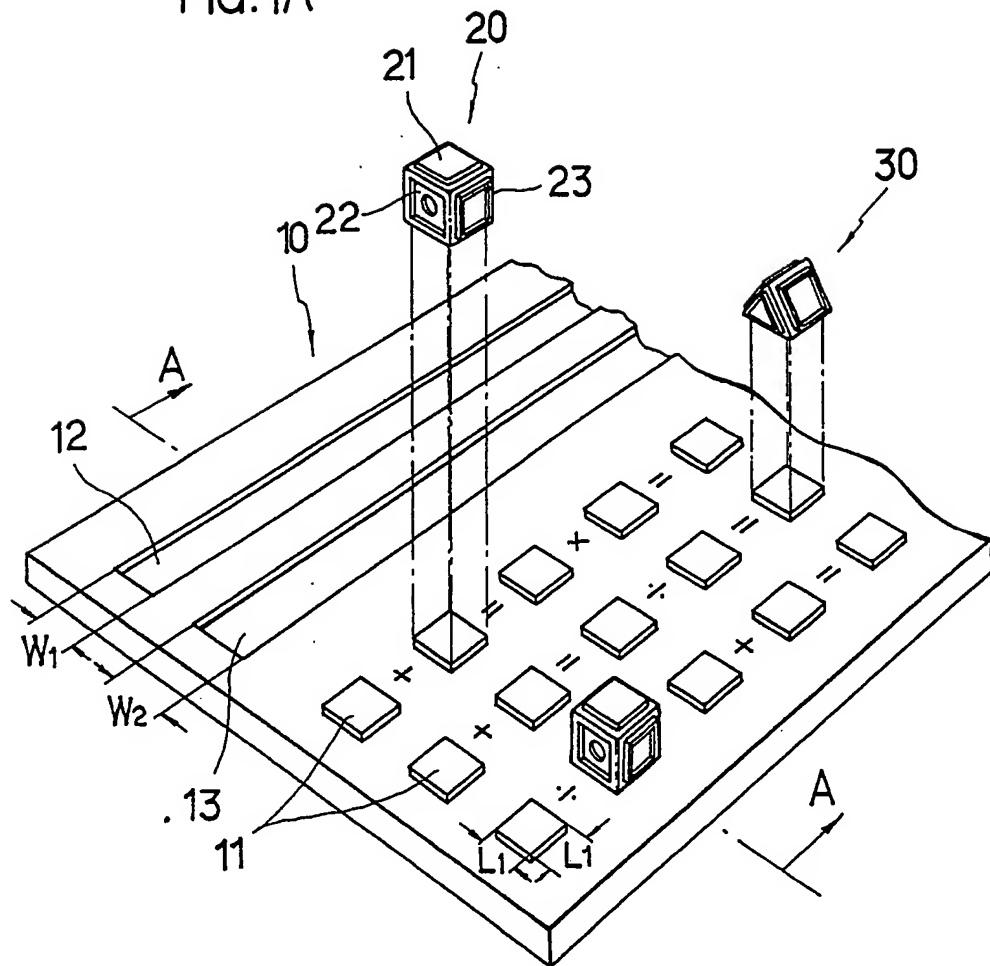


FIG. 1B

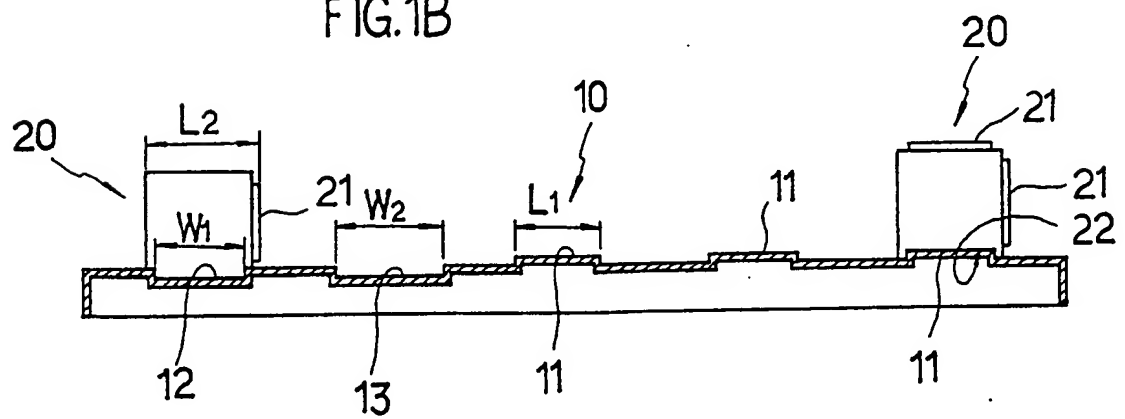


FIG. 2

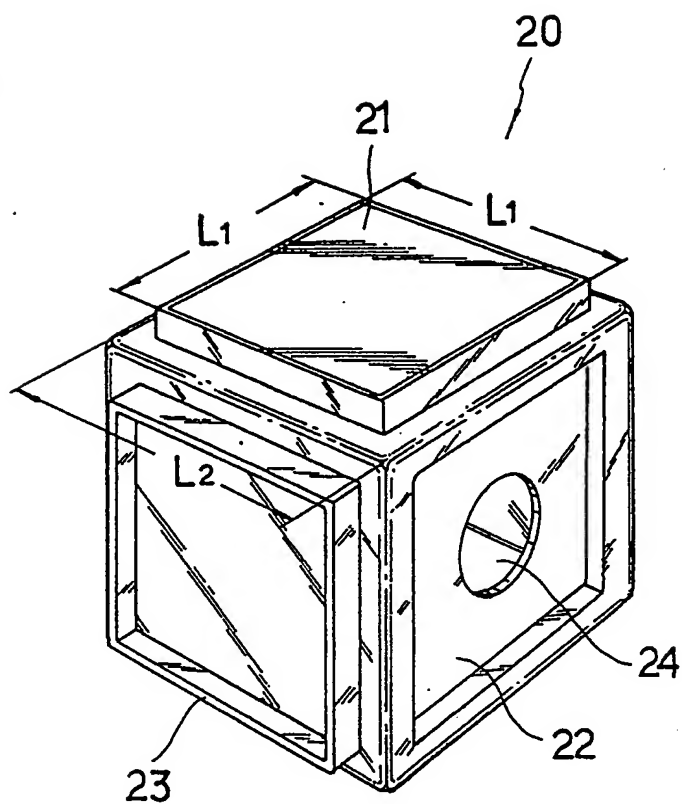


FIG. 3

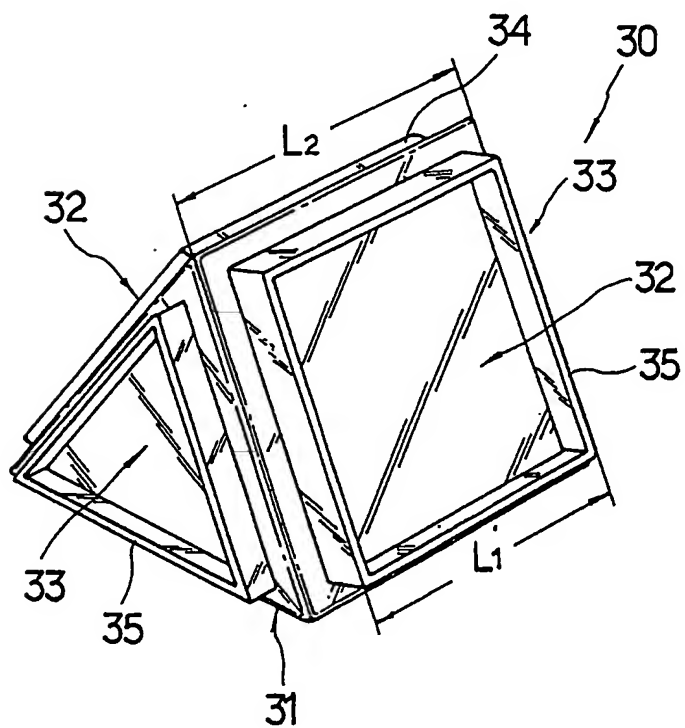


FIG.4

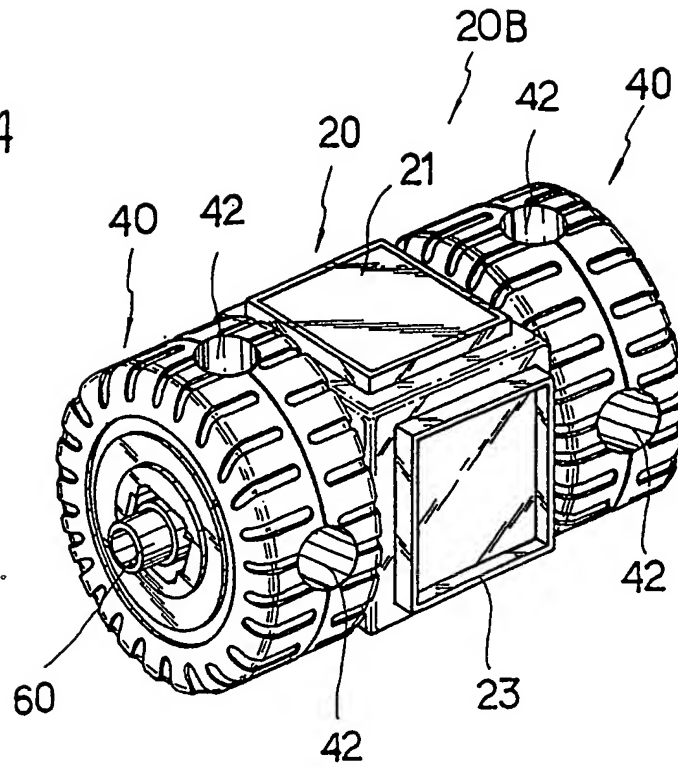
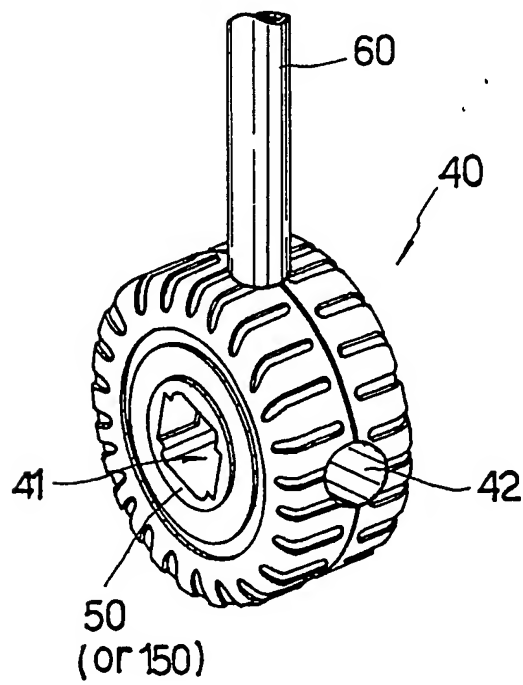


FIG.7



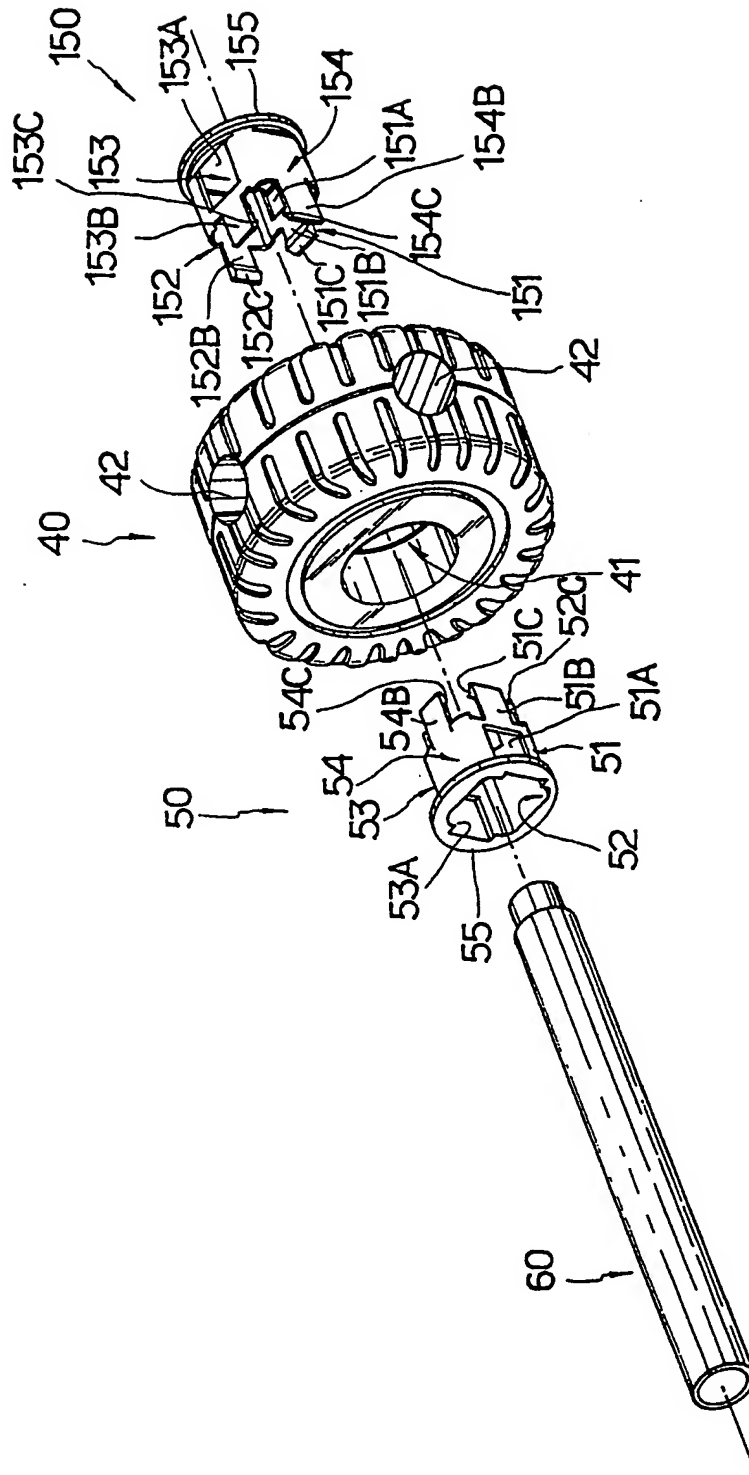


Fig. 5

FIG. 6A

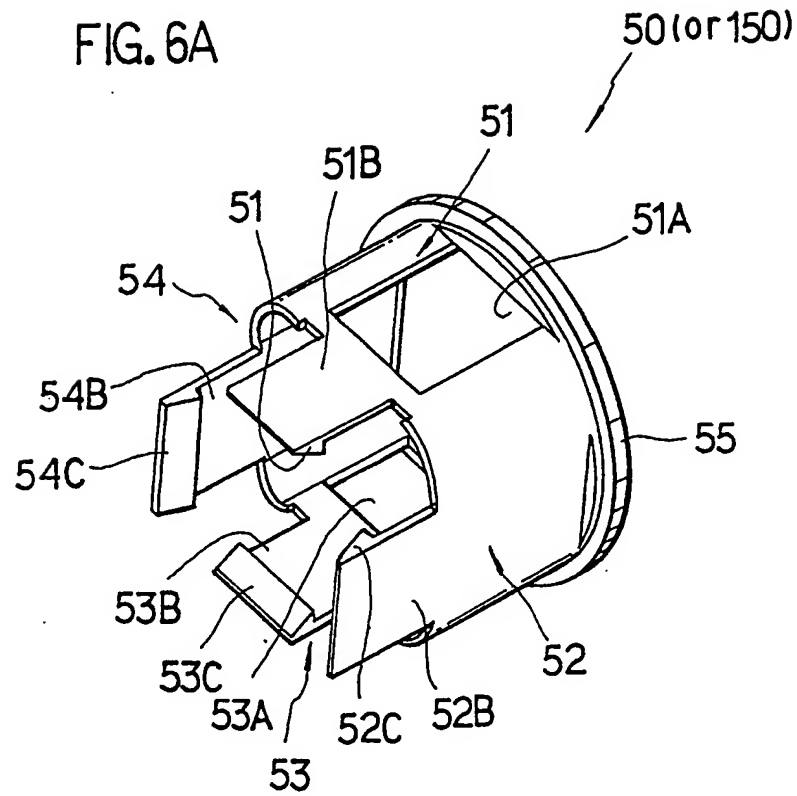


FIG. 6B

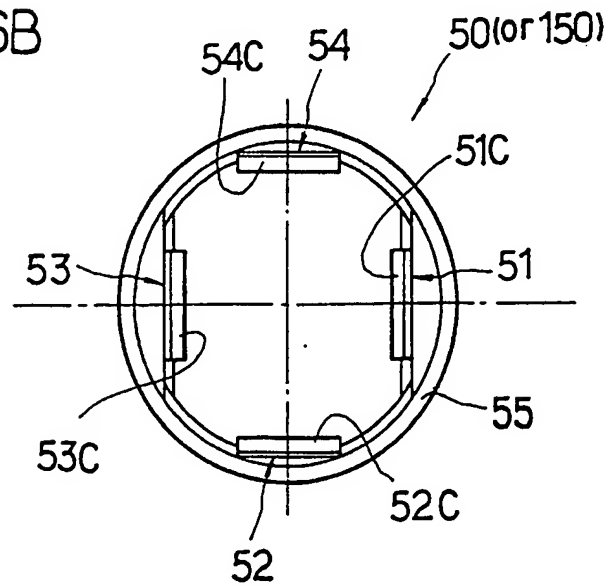


FIG. 8A

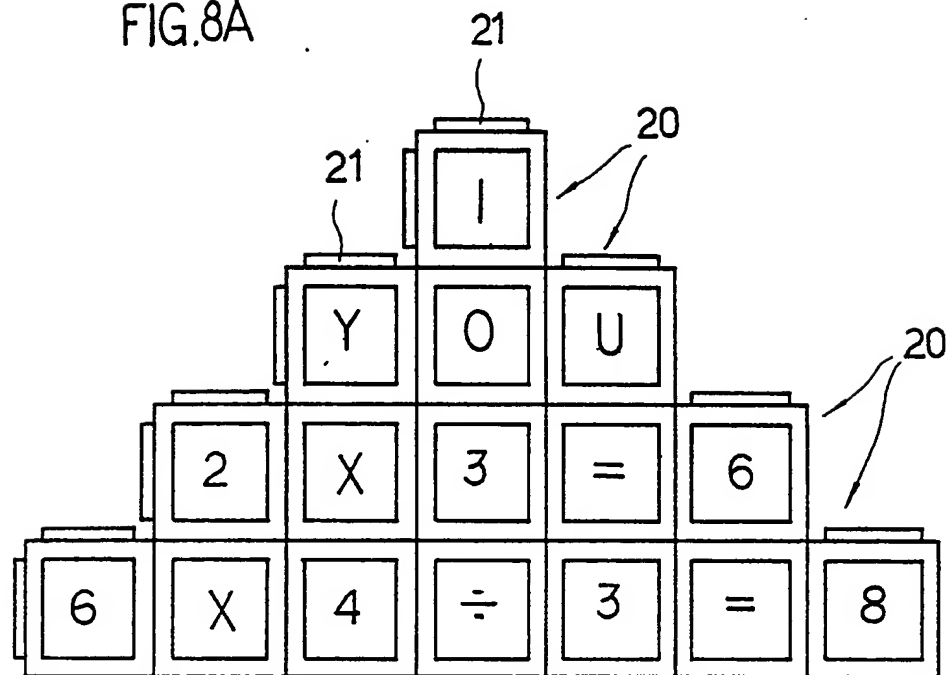
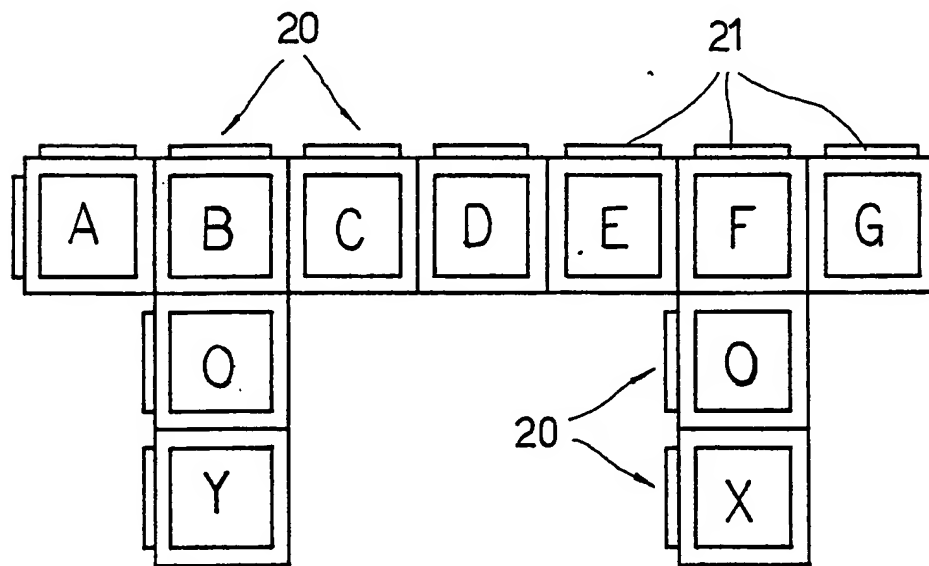


FIG. 8B



## EDUCATIONAL AND RECREATIONAL BLOCK ASSEMBLY

The present invention relates to an educational and recreational block assembly having a plurality of blocks, wheels and shafts for use with a block board, and more particularly to an educational and recreational block assembly which can be used not only for recreational purpose by assembling the plurality of blocks, wheels and shafts but also for educational purpose by inserting the plurality of blocks into the block board.

Generally, for infants aged 3-4 years, it is undesirable to forcibly cram them with fundamental numerical and character concepts. However, in order to initiate early education for those infants, such fundamental education should be required. To this end, it is more effective for them to acquire such knowledge naturally while they are playing rather than by instruction-centered manner.

Therefore, an education device which has the attributes of a toy is desired so that such knowledge can be obtained effortlessly while at the same time entertaining the infant.

In consideration of these matters, various educational toys have been proposed. However, since such toys are usually worked by moving and assembling a plurality of pieces on which a letter a numeral or a symbol are marked, they can only express a word or a numerical formula, and usually result in the assembly of a simple model car, plane, or the like.

Therefore, infants lose interest rather fast and can not acquire the educational and recreational effects as described above.

Furthermore, use of the prior art devices of, such as a monotonous color matching toy or a simple arrangement thereof, is boring to infants who are always curious, so that the educational effect for acquiring numeral and letter knowledge decreases.

In order to solve the above mentioned problem and to provide an educational device for infants which can increase the educational effect, development of such an educational device which can be enjoyed with interest not only by infants but also by children and which also cultivates thinking power and creative power in the user is needed.

An object of the present invention is to provide a block assembly for recreational and educational purpose which can satisfy infants and which can assist the infant in acquiring the fundamental substance of learning, for example letter and numeral spontaneity.

Another object of the present invention is to cultivate creative power in infants by the process of assembling the block and to develop thinking power and intellectual power in infants in the process of learning the block board.

The preceding objects should be construed as merely presenting a few of the more pertinent features and applications of the invention. Many other beneficial results can be obtained by applying the disclosed invention in a different manner or modifying the invention within the scope of the disclosure. Accordingly, other objects and a fuller understanding of the invention may be had by referring to both the summary of the invention and the detailed description, below, which describe the preferred embodiment in addition to the scope of the invention defined by the claims considered in conjunction with the accompanying drawings.

The educational and recreational block assembly of the present invention is defined by the claims with a specific embodiment shown in the attached drawings. For the purpose of summarizing the invention, the invention relates to an educational and recreational block assembly comprising a block board 10 having a plurality of protrusions 11 on a top surface of the block board 10. Each protrusion 11 has an area =  $L_1 \times L_1$  and a height (h). The protrusions are regularly spaced about the block board relative to each other in a longitudinal direction and in a direction perpendicular to the longitudinal direction. The block board 10 further includes a first and a second recess 12 and 13, respectively, formed on the top surface of the block board 10 in a longitudinal direction, with each first and second recess 12 and 13 having a different width,  $W_1$  and  $W_2$ , respectively, and an equal length. The first and second recesses 12 and 13 are spaced apart and parallel relative to each other. A plurality of hollow polyhedron blocks 20 are utilized. Each hollow polyhedron block has a plurality of surfaces, having the same side  $L_2$  as that of the second recess 13 ( $L_2 = W_2$ ) with each surface of each block having either a protrusion 21 which has the same area =  $L_1 \times L_1$  as the area of the protrusion 11 of the block board 10 or a recess 22 which is formed to receive therein the protrusion 11 of the block board 10, respectively, such that in use each block 20 can be combined to the block board 10 in such a way that:

- (1) the protrusion 21 of the block 20 is insertable into the first recess 12; (2) the recess 22 of the block 20 is receivable by any one of the plurality the protrusions 11 of the block board 10; and (3) the surface on which the recess 22 is formed, is insertable into the second recess 13 formed on the block board 10.

Each block further includes a hole 24, having an inner diameter, formed into opposing sides and extending through the block. A plurality of cylindrical shafts 60 are

employed with each shaft being insertable through the hole 24 of the block since each shaft 60 has an outer diameter which is equal to the inner diameter of the hole of the block. A plurality of wheels 40 are used, with each wheel having a circumference with a plurality of openings 42 formed about the circumference. Each wheel further includes a cylindrical hole 41 formed at the center of the wheel. The hole 41 and the openings 42 formed in the wheel cooperate with the plurality of shafts 60 such that in use a shaft is receivable by the hole 41 and/or opening 42. The wheels 40 further include a first shaft receiving member 50 and a second shaft receiving member 150 for securely receiving the shaft 60 which when the members 50, 150 are operatively received into the cylindrical hole 41 of the wheel 40. The wheel rotates freely about the first and second shaft receiving members 50, 150. The shaft frictionally fits into the first and second shaft receiving members 50, 150 to secure the shaft to the members 50, 150.

Preferably, the shape of the polyhedron blocks is a cubic shape or a triangular prism shape.

The educational and recreational block assembly further includes a wheeled toy block constructed by positing the shaft 60 through the holes formed in opposing sides of the block 20 such that both ends of the shaft 60 extend from the shaft. A wheel is positioned at each end of the shaft to form a wheeled block toy. In this embodiment, the first and second recesses are spaced apart a distance  $L_2$  to enable, in use, the wheels of the wheeled block toy to be simultaneously received into the first and second recesses to thereby align the wheeled block toy and to provide stability to the wheeled block toy to permit construction therefrom utilizing the plurality of shafts 60 in combination with the holes formed about the circumference of the wheel.

The more pertinent and important features of the present invention have been outlined above in order that the detailed description of the invention which follows

will be better understood and that the present contribution to the art can be fully appreciated. Additional features of the invention described hereinafter form the subject of the claims of the invention. Those skilled in the art can appreciate that the conception and the specific embodiment disclosed herein may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. Further, those skilled in the art can realize that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the claims.

For fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1A shows a perspective view of the block board and blocks according to the present invention;

Fig. 1B is a sectional view taken along the line A-A in Fig. 1A;

Fig. 2 is a perspective view of the first embodiment of the block;

Fig. 3 is a perspective view of the second embodiment of the block;

Fig. 4 is a partial perspective view of a toy using a block, a pair of wheels and a shaft;

Fig. 5 is an exploded perspective view of the wheel and shaft of Fig. 4 with parts disassembled;

Fig. 6A is a perspective view of a shaft receiving member;

Fig. 6B is a left side view of Fig. 6A;

Fig. 7 illustrates another condition using the wheel and shaft; and

Fig. 8A and Fig. 8B are front views of assembly toy using only blocks.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Fig. 1A is a perspective view of blocks 20 and a block board 10 according to the present invention and Fig. 1B is a sectional view taken along the line A-A in Fig. 1A.

The block shown in Fig. 1A may have the structure of a polyhedron. The basic structure is formed of hollow cubic shape 20 A.

Three square protrusions 21 which have same area and same height relative to each other are formed on three surfaces of the cubic block 20, for example, top, left side and front surface, respectively. Three square recesses 22 which have same area and same depth relative to each other are formed on the remaining surfaces of the cubic block 20, for example, bottom, right side and rear surface, respectively.

Each protrusion 21 has substantially the same area as that of each recess 22, consequently, the block 20 can be combined with another block by using the protrusion 21 and the recess 22. (Details of the structure will be described below with reference to Fig. 3)

The protrusion 21 (or recess 22) of the block 20 shown in Fig. 1A is insertable into the recess 22 (or protrusion 21) of another block which has the same structure as that of the block 20, and therefore a pair of blocks 20 may be combined together. A plurality of blocks 20 can be combined together by the manner described above.

On the other hand, each surface of the protrusions 21 and recesses 22 of the block 20 is marked with a numeral, a letter or a symbol. Also, each block 20 has distinctive color so that the effect of visual education can be obtained.

The structure of the block board 10 includes a plurality of protrusions 11 formed on the surface of the

block board 10. Each protrusion 11 has same area and same height relative to the protrusion 21 of the block 20 described above. Consequently, the recess 22 of the block 20 can be inserted on the protrusion 11 of the block board 10.

Therefore, the block 20 can be combined on the block board 10 by inserting the recess 22 of the block 20 on the protrusion 11 of the block board 10.

Each space between the protrusion 11 and neighbor protrusion of the block board 10 is marked with an operation symbol, such as "+", "-", "x", or "=".

The operation symbol is used for making a simple numerical formula using the numeral marked on each surface of the blocks 20 which are combined with the protrusions 11 of the block board 10.

For example, by using the recess 22, the blocks 20 which are marked with "1" and "3" on the surface thereof are inserted, respectively, on the protrusions 11 located at the right and left side of the space which is marked with "+" on the block board 10. And then, when presenting the block board 10 to the infant, the infant can select for oneself the block 20 which is marked "4" on the surface thereof, and insert the block 20 on the protrusion 11 located at the right side of the space which is marked with "=". Therefore, infants can acquire a fundamental concept of numeral by repeating the procedure mentioned above.

The elongated recesses, namely the first and second recesses 12, 13, are formed on a part of the block board 10, so that each protrusion 21 of a plurality of the blocks 20 can be inserted in the elongated recess 12 of the block board 10. The length of the first recess 12 is equal to that of the second recess 13, but the width of the first recess 12 differs from that of the second recess 13. Namely, the width  $W_1$  of the first recess 12 is equal to the width  $L_1$  of the protrusion 21 of the block 20 shown in Fig. 1A, and the width  $W_2$  of the second recess 13 is equal to the width  $L_2$  of the block 20 itself.

Therefore, the protrusion 21 of the block 20 is insertable into the first recess 12 of the block board 10, and the block 20 itself is inserted in the second recess 13 of the block board 10. The block 20 itself is inserted in the second recess 13 of the block board 10 and therefore diverse letters, numerals which are marked on each surface of the block 20 can be expressed without regard to existence of the protrusion 21. As a result of this, a variety of number or word expressions can be obtained by the blocks 20 and block board 10.

Fig. 2 is a perspective view of the first embodiment of the block 20 shown in Fig. 1A.

Two circular holes 24 which have a certain diameter are formed at each center of a surface and the opposite surface, for example, front and rear, top and bottom, or right and left side surfaces, of the cubic block 20, respectively.

In Fig. 2, the holes 24 are formed on only two surfaces of the block 20, respectively, but the holes 24 can be formed on all the surfaces of the block 20. When the protrusion 21 of the block 20 is inserted in the recess 22 of another block, the hole 24 which is in communication with the interior of the block 20 enables the air which otherwise would remain in the space between the protrusion and the recess of pair of blocks 20 to escape. Hence, effort is not required for infants to assemble or disassemble of the blocks, so that infants can assemble or disassemble the blocks easily.

After a shaft (described below) is inserted through two opposing holes 24, a wheel may be secured to each end of the shaft which extends from the surface of the block 20, respectively, so that a new toy is assembled.

A detailed description of relation of the shaft and the block is given hereinafter.

On the other hand, instead of the protrusion 21, a wall 23 can be formed on the surface of the block 20, which has the same height as that of the protrusion 21 and has

the same area as that of the protrusion 21 so that the wall 23 performs the same function as that of the protrusion 21.

Fig. 3 is a perspective view of the second embodiment of the block and illustrates a block 30 which has a hollow triangular prism shape instead of a cubic shape. Namely, a bottom surface 31 and both oblique side surfaces 32 are squares which have same areas relative to each other. However, the rear and front surfaces 33 are equilateral triangles. Provided also is a wall 35 at one side and a recess (not shown) at the opposite side of the rear and front surfaces 33 of the block 30, so that the wall 35 of anyone of the blocks 30 can be inserted into the recess of any other of the blocks 30. A pair of protrusions 34 are formed on the both side surfaces 32 respectively, and a recess (not shown) is formed on the bottom surface 31 of the triangular prism block 30.

The dimension (area, height or depth) of the protrusion 34 and recess is equal to that of the protrusion 21 and recess 22 which are formed on each surface of the cubic block 20. Therefore, the protrusion 34 of the triangular prism block 30 can be inserted in the recess 22 of the cubic block 20, so that the triangular prism block 30 and the cubic block 20 may be combined together.

On the other hand, instead of the protrusion 34, a wall 35 also can be formed on the surface of the triangular prism block 30, which has the same height as that of the protrusion 34 and has the same area as that of the protrusion 34, so that the wall 35 performs the same function as that of the protrusion 34.

As described above, toys which have various shapes can be assembled by using the cubic blocks 20 and the triangular prism blocks 30. More specifically, according to the present invention, a curve shape and even rounded shape toys can be obtained by utilizing the triangular prism blocks 30. It is noted that the protrusions 34 and walls 35, which have a predetermined surface shape, applied to the blocks 20 and 30 according to the present invention

can be inserted both into the first recess 12 of the block board 10 and into the recess 22 of the blocks 20 and 30 (not shown) which have a shape corresponding to the predetermined surface shape described above, respectively.

Fig. 4 is a perspective view of the block which is combined with a shaft 60 and a pair of wheels which forms a wheeled block toy 20B. The shaft 60 is inserted in the block 20 through the pair of holes 24 shown in Fig. 2 which are formed on opposing surfaces of the block 20 respectively, and both ends of the shaft 60 extend from the surfaces of the block 20. Then a pair of wheels 40 are inserted on both ends of the shaft 60, respectively, to construct a unit assembly. Also, a plurality of unit assemblies which are assembled with the block 20, shaft 60 and the wheels 40 can be made. Therefore, a plurality of unit assemblies may be combined with a plurality of blocks 20 so that an assembled toy can be constructed. The block toy which is assembled with the shafts 60, the wheels 40 and a plurality of blocks 20 can easily be moved along a flat surface, such as a floor, by the rotation of the wheels 40.

As described above, by utilizing a plurality of blocks 20, shafts 60 and the wheels 40, a diversity of different shaped block toys can be made.

In another embodiment, the first and second recesses are spaced apart a distance  $L_2$  which is the length of the side of side  $L_2$  of one of the surfaces of the hollow polyhedron block. This enables, in use, the wheels of the wheeled block toy to be simultaneously received into the first and second recesses to thereby align the wheeled block toy on the block board and to provide stability to the wheeled block toy. This permits construction from the surface of the block board utilizing the plurality of shafts 60 in combination with the holes formed about the circumference of the wheel.

Fig. 5 is an exploded perspective view of Fig. 4, in which the structure of the wheel 40 and a pair of shaft

receiving members 50, 150 is illustrated. The wheel 40 has a tire shape and a cylindrical hole 41, which receives a pair of shaft receiving members 50, 150 having the same structure, formed on the central part of the wheel 40. A plurality of openings 42 are formed at regular intervals on the circumference of the wheel 40. Each opening 42 has a diameter which is the same as the diameter of the shaft 60. For the sake of convenience, only one of a pair of shaft receiving members 50, 150 which are received in the cylindrical hole 41 of the wheel 40 is described in detail with reference to Fig. 6A and Fig. 6B.

Fig. 6A is a perspective view of the shaft receiving member 50, and Fig. 6B is the side view of Fig. 6A. The shaft receiving member 50 for receiving the shaft 60 has a body comprising a first 51, a second 52, a third 53 and a fourth 54 plate each of which is flat. The area of the first plate 51 and the third plate 53 is larger than that of the second plate 52 and the fourth plate 54 so that the shape of the shaft receiving member 50 is rectangular. Junction parts between each plate 51, 52, 53, 54 are formed with a rounded shape.

The first and third plates 51, 53, respectively, are larger than the second and fourth plates 52, 54.

A circular plate 55 is integrally formed at the end of each plate 51, 52, 53, 54, and is extended vertically from each plate 51, 52, 53, 54. Four guide parts 51B, 52B, 53B, 54B extend horizontally from the opposite end of each plate 51, 52, 53, 54, respectively, with a certain length.

Four inclination parts 51C, 52C, 53C and 54C which protrude on inner surface of each guide part 51B, 52B, 53B and 54B, are formed at the end of each guide part 51B, 52B, 53B and 54B, respectively. Each inclination part 51C, 52C, 53C and 54C gradually increases toward the inside and the end of each inclination part 51C, 52C, 53C and 54C is perpendicular to the inner surface of each guide part 51B, 52B, 53B and 54B, respectively.

The combination of the first and second shaft

receiving members 50, 150 which are formed as described above and the wheel 40, is described with reference to Fig. 5, Fig. 6A and Fig. 6B.

First of all, the first shaft receiving member 50 is received in the cylindrical hole 41 of the wheel 40, therefore the circular plate 55 is in contact with a side surface of the wheel 40. In the same way, the second shaft receiving member 150 is inserted in the opposite cylindrical hole 41 of the wheel 40. Then, the second shaft receiving member 150 is combined with the first shaft receiving member 50 as rotated 90 degree with respect to the first shaft receiving member 50 which has been already received in the cylindrical hole 41 of the wheel 40, so that the first plate 151 and third plate 153 of the second shaft receiving member 150 correspond to the second plate 52 and fourth plate 54 of the first shaft receiving member 50, respectively. Similarly, a second plate 152 and fourth plate 154 of the second shaft receiving member 150 correspond to a third plate 53 and first plate 51 of the first shaft receiving member 50, respectively.

As the second shaft receiving member 150 is pushed further, the inclination parts 152C, 154C formed at the ends of the second plate 152 and fourth plate 154 of the second shaft receiving member 150 respectively are slid on the outer surfaces of the guide parts 53B, 51B which are extended horizontally from the third plate 53 and the first plate 51 of the first shaft receiving member 50, respectively, and at the same time, the outer surfaces of the guide parts 151B, 153B which are extended horizontally from the first plate 151 and third plate 153 of the second shaft receiving member 150 respectively, are slid while contacting with the inclination parts 52C, 54C formed at the ends of the second plate 52 and fourth plate 54 of the first shaft receiving member 50, respectively. By pushing further, the first shaft receiving member 50 is completely combined with the second shaft receiving member 150 in the cylindrical hole 41 of the wheel 40. In this condition,

the inclination parts 152C, 154C formed at the ends of the second plate 152 and the fourth plate 154 of the second shaft receiving member 150 respectively are caught in the openings 53A, 51A formed on the third plate 53 and the first plate 51 of the first shaft receiving member 50, respectively, also the inclination parts 52C, 54C formed at the ends of the second plate 52 and the fourth plate 54 of the first shaft receiving member 50, respectively, are caught in the openings 151A, 153A formed on the first plate 151 and the third plate 153, respectively.

Accordingly, the first shaft receiving member 50 and the second shaft receiving member 150 are combined together by four openings 51A, 53A, 151A and 153A and four inclination parts 52C, 54C, 152C and 154C. Each guide part 51B, 53B, 151B and 153B including the remaining inclination parts 51C, 53C, 151C and 153C is positioned in the inside of the opposed shaft receiving members 150, 50. Because each guide part 154B, 152B, 52B and 54B itself has elasticity, each inclination part 154C, 152C, 52C and 54C formed at end of the each guide part 154B, 152B, 52B and 54B can be received in each opening part 51A, 53A, 151A and 153A.

After being combined, the vertical plane of each inclination part 154C, 152C, 52C and 54C is caught in the end of each opening part 51A, 53A, 151A and 153A, respectively, so that separation of the first shaft receiving member 50 and the second shaft receiving member 150 is very difficult.

The inner diameter of the cylindrical hole 41 of the wheel 40 is larger than a circle circumscribed with the second plate 52, 152 and the fourth plate 54, 154 of the first shaft receiving member 50 and the second shaft receiving member 150, so that the pair of shaft receiving members 50, 150 combined together can freely rotate in the cylindrical hole 41 of the wheel 40, and each inner surface of the two circular plates 55, 155 formed at each end of the first and second shaft receiving member 50, 150

respectively contacts with each side surface of the wheel 40, so that the pair of the shaft receiving members when combined together do not separate from the wheel 40.

After the first and second shaft receiving member 50, 150 are combined together in the cylindrical hole 41 of the wheel 40, the shaft 60 is inserted in the first and second shaft receiving member 50, 150.

In the process receiving, the shaft 60 is pressed by four inclination parts 51C, 53C, 151C and 153C formed at the end of the guide parts 51B, 53B, 151B and 153B of the first and second shaft receiving member 50, 150 respectively, because the outer diameter of the shaft 60 is larger than a circle inscribed with four inclination parts 51C, 53C, 151C, 154C.

Therefore, four inclination parts 51C, 53C, 151C and 153C press the shaft 60 owing to the resilient force of four guide parts 51B, 53B, 151B and 153B, so that the shaft 60 is frictionally secured within the first and second shaft receiving member 50, 150 which are combined together in the cylindrical hole 41 of the wheel 40. Accordingly natural separation of the shaft 60 from the wheel 40 is difficult unless a force is applied to the shaft 60 or the wheel 40. As a result of this, the first and the second shaft receiving member 50, 150 and the shaft 60 do not rotate while the wheel 40 freely rotates.

As described above, the shaft 60 is inserted in the cubic block 20 shown in Fig. 2 through the pair of holes 24, and then, a pair of wheels 40, which receives a pair of shaft receiving members 50, 150 through the cylindrical hole 41, are inserted at the shaft which is exposed at both surfaces of the block 20, respectively (shown in Fig. 4).

Thereon, a plurality of blocks which are combined with the shaft 60 and a pair of wheels 40, are combined with another block assembly which is formed with a plurality of blocks and has a shape of a car without wheels, so a toy having the wheels is constituted finally. Accordingly, a

toy which is assembled in the manner described above can be moved naturally by rotation of the wheels.

On the other hand, when an end of the shaft 60 is inserted into one of the openings 42 which are formed on the circumference of the wheel 40 and then another end of the shaft 60 is inserted in the hole 24 of the cubic block 20 so that a different toy, for example, air plane or helicopter can be assembled. More detailed description is given in conjunction with Fig. 7.

Fig. 7 is a perspective view of the wheel and the shaft in another use condition. For the sake of convenience, only a wheel and a part of a shaft are illustrated. Unlike Fig. 4, Fig. 7 illustrates that an end of the shaft 60 is inserted in one of the openings 42 which are formed on circumference of the wheel 40. Another end of the shaft 60 is inserted in the block (not shown) through the hole 24 (in Fig. 2). Then, another block assembly which is formed with a plurality of the blocks (20 in Fig. 2, or 30 in Fig. 3) and has a shape of air plane or helicopter, is combined with the blocks 20 which are inserted to each shaft 60 (in Fig. 7) respectively, so that a toy, airplane or helicopter, or the like may be constructed.

Fig. 8A and Fig. 8B are front views of the assembly toys using a plurality of blocks (20 in Fig. 2). A plurality of protrusions (21 in Fig. 2, 34 in Fig. 3) and recesses (22 in Fig. 1A) are combined with each other so that various kinds of toys can be assembled. On the one hand, as illustrated in Fig. 8A and Fig. 8B, in the process of assembling blocks for a toy, each surface of the each block 20, which is marked with a numeral or operation symbol, is displayed on the facade of the assembly toy so that numerical formula can be expressed on the assembly toy. Also, each surface of the each block 20, which is marked with a letter, is displayed on the facade of the assembly toy so that a word or simple sentence can be expressed on the assembly toy. Therefore, in the process

of assembly of the toy blocks in combination with the block board, infants can acquire simple numerical formula concepts and simple words.

According to the present invention, the power of concentration and observation of infants can be cultivated in the process of inserting and separating of the blocks which are marked with varied numeral, letter and symbol respectively on the surface of the block board. Especially, infants can for themselves select each block which is marked with specific numeral in accordance with numerical formula marked on the block board, and insert the block in the recesses of the block board, so that the fundamentally mathematical ability of infants can be cultivated. Besides educational function as described above, infants for themselves assemble the various kinds of toys using a plurality of blocks (Cubic and triangular prism shape), wheels and shafts, so that they can make the most of the peculiar function of the toy and at the same time the creative power of infants can be cultivated naturally.

Although this invention has been described in its preferred form with a certain degree of particularity, it is appreciated by those skilled in the art that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of the construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention.

CLAIMS:

1. An educational and recreational block assembly comprising:

a block board 10 having a plurality of protrusions 11 on a top surface of said block board 10, with each said protrusion 11 having an area =  $L_1 \times L_1$  and a height (h) and with said protrusions being regularly spaced about said block board relative to each other in a longitudinal direction and a direction perpendicular to said longitudinal direction, said block board 10 further including a first and second recess 12 and 13 formed on said top surface of said block board 10 in a longitudinal direction, with each said first and second recess 12 and 13 having a different width,  $W_1$  and  $W_2$ , respectively, and an equal length and with said first and second recesses 12 and 13 being spaced apart and parallel relative to each other;

a plurality of hollow polyhedron blocks 20, 30 provided with a plurality of surfaces, having a side  $L_2$  equal to said width of said second recess 13 ( $L_2 = W_2$ ) and with each said surface of each said block having either protrusions 21, 34 which have the same area =  $L_1 \times L_1$  as said area of said protrusion 11 of said block board 10 or a recess 22 which is so formed to fit therein said protrusion 11 of said block board 10, respectively, such that in use each said block 20, 30 can be combined both to each other to said block board 10 in such a way that said protrusions 21, 34 of said block 20, 30 are inserted into said first recess 12, said recess 22 of said block 20, 30 are received by any one of said plurality said protrusions 11 of said block board 10 and said surface on which said recess 22 is formed, is insertable into said second recess 13 formed on said block board 10;

each said block further including a hole 24 formed therethrough and with said hole having an inner diameter;

a plurality of cylindrical shafts 60 for inserting through said hole 24 of said block, with each said shaft 60

having an outer diameter equal to said inner diameter of said hole of said block;

a plurality of wheels 40 for co-operating with said plurality of shafts 60, with each said wheel having a circumference, a cylindrical hole 41 formed at a center thereof and a plurality of openings 42 formed at said circumference thereof; and

said wheels 40 further including a first shaft receiving member 50 and a second shaft receiving member 150 for securely receiving and permitting said shaft 60 which when said members 50,150 are operatively received into said cylindrical hole 41 of said wheel 40, said wheel to rotate freely about said first and second shaft receiving members 50,150.

2. The educational and recreational block assembly of claim 1 wherein said plurality of polyhedron blocks are formed in a cubic shape.

3. The educational and recreational block assembly of claim 1 wherein said plurality of polyhedron blocks are formed in a triangular prism shape.

4. The educational and recreational block assembly of claim 1 wherein said first and second shaft receiving member define a pair of hollow bodies 50A and 150A, respectively, for receiving said shaft and for rotatably securing one of said wheels to said shaft with each hollow body having a first, a second, a third and a fourth plate 51, 52, 53, 54 and 151, 152, 153, 154, respectively, with the area of said first and third plate being larger than that of said second and fourth plate;

a pair of openings 51A and 53A, 151A and 153A formed on said first and third plate of each said hollow body, respectively;

a circular plate 55, 155 integrally formed at one end of each said hollow body and extending radially therefrom;

four guide parts 51B, 52B, 53B, 54B and 151B, 152B, 153B, 154B, respectively, extending from the other end of each said first, second, third and fourth plate, respectively;

four inclined parts 51C, 52C, 53C, 54C and 151C, 152C, 153C, 154C, respectively, formed at the end of each said guide part, such that in use when one of said hollow bodies is slidably joined with the other said hollow body each said inclined part 52C, 54C and 152C, 154C extending from each said second plate 52 and 152 and third plate 54 and 154, respectively, is secured into said openings 151A and 153A and 51A and 53A, respectively, and each said inclined part 51C, 53C and 151C, 153C being slidably forced toward the interior of said hollow body such that in use when said bodies are slidably inserted into said cylindrical hole 41 of said wheel 40 thereby securing said bodies together to enable said wheel to be rotatably secured to said bodies and upon inserting said shaft into said hollow bodies said shaft frictionally engages said inclination parts 51C, 53C, 151C and 153C to secure said shaft to said hollow bodies.

5. An educational and recreational block assembly substantially as described herein with reference to the accompanying drawings.

**Patents Act 1977**  
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**Section 17 (The Search Report)**

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**Relevant Technical fields**

(i) UK CI (Edition K ) A6S

(ii) Int CI (Edition ) A63H

**Databases (see over)**

(i) UK Patent Office

(ii)

Search Examiner

E W Bannister

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Documents considered relevant following a search in respect of claims

ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

SF2(p)

Category	Identity of document and relevant passages	Relevant to claim(s)

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